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STUDIES IN THE GENUS *HEVEA* V

THE STATUS OF THE BINOMIAL *HEVEA* DISCOLOR

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THE name *Hevea discolor* (Spruce ex Benth.) Muell.-Arg. appears throughout the literature of *Hevea*, but it is used in such a confused way that serious doubt still plagues its exact meaning.

Until rather recently, *Hevea discolor* has been accepted as a binomial representing a distinct specific concept. In 1858, Baillon (Etud. Euphorb. (1858) 326) accepted *Siphonia discolor* as a valid species. Mueller-Argoviensis (in D.C. Prodr. 15, pt. 2 (1866) 717; in Martius Fl. Bras. 11, pt. 2 (1874) 299) also considered it to be distinct, placing it near *Hevea Spruceana* (Benth.) Muell.-Arg., because of its having obtuse staminate buds. In 1908, Huber (in Bol. Mus. Goeldi 5 (1908) 247) indicated the extreme closeness of *Hevea discolor* to *H. Spruceana* and suggested that one day it might be necessary to unite it with *H. Spruceana* and *H. similis* Hemsley. He stated: [translation] “. . . that *H. discolor* does not differ in essential characters, excepting in the size of the flowers, from *H. Spruceana* is a fact which is seen more and more as our study of the two species progresses. I

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myself must confess that it is impossible to distinguish . . . specimens which can positively be referred to *H. discolor*, in spite of the fact that the leaves of many of our specimens agree much more with this species than they do with *H. Spruceana*, according to Mueller's description . . . It is true that the few opened flowers of these specimens [*Poeppig* 2595, *Spruce* 1171] are much smaller than the completely developed flowers of *Hevea Spruceana*, but it seems to me that this can be due to their not having finished their growth. In our specimens from the lower Japurá and Teffé, from the area of *Hevea discolor*, there is such a curious mixture of characters of *H. discolor*, *H. similis* and *H. Spruceana*, that I have not been able to attribute them to one or the other species without reservation. At any rate, it is certain that the seeds of *Hevea discolor* from the mouth of the Rio Negro . . . and of *H. similis* from the lower Japurá are so similar to those of *H. Spruceana* from Obidos that, if they should be mixed, they could not again be separated."

In summary, Huber mentioned that *Hevea discolor* must be taken from the list of trees yielding good rubber and be placed amongst those of no commercial value, together with *H. Spruceana* and *H. similis*, with which concepts it may one day have to be united in one single species.

In his monograph of *Hevea*, Pax (in Engler's *Pflanzenr.* 4, 147 (1910)) retained *H. discolor* as a distinct species, placing *H. Spruceana*, *H. similis* and *H. discolor* together as species with obtuse staminate buds and a pilose under surface of the leaf. The only difference he noted between *Hevea discolor* and the other two concepts lay in the size of the staminate flowers.

Shortly thereafter, Huber (in *Bol. Mus. Goeldi* 7 (1913) 645–646, 650) accepted, apparently without hesitation, *Hevea discolor* as representing a distinct species,

allied to and coinciding more or less in geographical distribution with *H. Spruceana* and *H. similis*.

The problem of the real meaning of *Hevea discolor* was left unattended until 1925, when Ducke (in Arch. Jard. Bot. Rio Janeiro 4 (1925) 111) stated that *H. discolor* Muell.-Arg. and *H. similis* Hemsley, both from the State of Amazonas, have the appearance, the low-quality latex and the common name of *H. Spruceana*, and are separated from this species only by a few characters of little importance in the leaves and flowers; he was convinced that it was a question of mere varieties, having found, even among the trees of *H. Spruceana* at Obidos, a strong variation in the size of the flowers.

Subsequently, in 1929, Ducke (in Rev. Bot. Appl. 9 (1929) 630) stated that *Hevea discolor* represents a form, not even a geographical variety. Nevertheless, he pointed out that in the upper Amazon there is a predominance of trees whose leaflets are strongly pilose and which correspond especially to *discolor*; whereas in the lower Amazon, the leaves are usually almost glabrous. Ducke further noted that sterile specimens of his *Hevea Spruceana* forma *discolor* can easily be confounded with *H. Benthamiana* Muell.-Arg., a fact which he believes is the basis of the confusion in the literature of the past, which attributed the best rubber of the Rio Negro (extracted from *H. Benthamiana*) to *H. discolor*. Later, he reiterated the same opinion (in Arch. Jard. Bot. Rio Janeiro 5 (1930) 156). Five years afterwards, in his monograph of the genus (in Arch. Instit. Biol. Veg. 2 (1935) 239), he definitely reduced the binomial *Hevea discolor* to synonymy under *H. Spruceana*. This treatment is retained in Ducke's most recent synopsis of *Hevea* (Bol. Técn. Instit. Agron. Norte no. 10 (1946) 20, 23).

Recently, Baldwin (in Journ. Hered. 40 (1949) 48) has intimated that the well known and firmly established

binomial *Hevea Benthamiana* might have to be given up in favor of *H. discolor*. He stated: “*Hevea discolor* (Spruce ex Bentham) Muell.-Arg. was based on type material now usually referred in part to *H. Spruceana* (Benth.) Muell.-Arg. and in part to *H. Benthamiana* Muell.-Arg.; since *H. discolor* antedates the last name, *H. Benthamiana* would seem to be invalid.”

This very problem has perturbed me for several years. In 1947, when I had an opportunity of studying abundant typical material of *Hevea* in various British herbaria, it appeared to me that the name *H. discolor* referred to a confused concept based upon two different species.

Notwithstanding the fact that the problem is fundamentally nomenclatorial and can be settled only by consultation with the literature and type specimens, I decided to let definitive studies of the question lie in abeyance pending a visit to and a sojourn in the type localities, during which a critical examination of many living individuals and the collection of ample topotypical material could be effectuated. This field work has been carried out, and the literature and type material have been studied again in the light of knowledge gained in the field. I am now convinced that, in accordance with the International Rules of Botanical Nomenclature, *Hevea discolor* may be rejected and that the well-established names, *H. Benthamiana* and *H. Spruceana*, may continue in an unaltered status.

A study of the status of *Hevea discolor* as a binomial necessitates a careful examination of Bentham's description and discussion (in Hooker's Kew Journ. Bot. 6 (1854) 369):

S. discolor, Spruce, MC.; foliolis breviter petiolulatis discoloribus subtus pubescentibus, glandulis parvis, panícula tomentosa, pedicellis flore brevioribus, calycibus obtusis, antheris 7-10 duplici serie verti-

cillatis.— *S. brasiliensis*, H.B.K., Nov. Gen. et Sp. vol. vii, p. 170 ? vix Willd.— *Micrandra ternata*, R. Br. Pl. Jav. Rar. p. 237.

Common in the gapó of the Rio Negro and of its tributary the Rio Uaupés, and known by the name of *Seringue de gapó*. The tree scarcely exceeds 25 feet, but the branches spread out horizontally, sometimes to a considerable distance. The milk is sparing, and elastic when dry. The leaves are like those of *S. elastica*, but always more or less pubescent underneath, generally 4 or 5 inches long; the flowers of a reddish-purple. The anthers are small and ovate, in two distinct verticils, sometimes both complete, with five in each, but one or two are frequently wanting in the upper one, and occasionally one also of the lower one. Some specimens in fruit of Mr. Spruce's first Barra collection were distributed as belonging doubtfully to the *S. elastica*. I have referred here Mr. Brown's species, on account of the pubescence of the underside of the leaf.

Bentham did not cite any specimens in connection with the description of *Siphonia discolor*. However, we find preserved at Kew two of Spruce's collections which have been annotated, one apparently in Bentham's own hand, as representing *Siphonia discolor*. One of these collections (*Spruce 1171*) was made "ad oram septentrionalem flum. Amazonum, ad ostium Rio Negro" in August 1851 and represents the expression of *Hevea Spruceana* which is abundant in the vicinity of Manáos. The other (*Spruce 2560*) was collected "prope Panuré ad Rio Uaupés in the period from October 1852 to January 1853 and is the type of Mueller's *Hevea Benthamiana*. We are certain that these two collections entered into Bentham's consideration of *Hevea discolor*, for we know: (1) that *H. discolor* was based upon Spruce collections; (2) that Bentham's geographical data ("common in the gapó of the Rio Negro, and of its tributary the Rio Uaupés") correspond to the localities of *Spruce 1171* and *2560*; and (3) that there are no other contemporary collections annotated with the binomial under discussion.

Furthermore, in Spruce's field notebook, preserved at Kew, we find the following annotation against his collec-

tion 2560 which indicates that he himself considered these two collections as representing the same concept:

2560. *Siphonia discolor* sp. n. gapó. Sm. milky tree 20 ft. Petioles $5\frac{1}{2}$ in. Lts. $6\frac{1}{8} \times 3$, subov.-ellipt. with abrupt subobt. apic. ven. wsh. and pubt. Pans. subpubt. Fl. very p. y. pubt., segm. acum. cf. Barra [Manáos] *Siphonia* 1171.

If we analyze, point for point, Benthams description, we find that the leaflets, with their short petiolules, difference in color of the two surfaces, presence of hair on the under surface and small glands, possess characters which one finds to be common to the two concepts which *Spruce* 1171 and 2560 represent. Indeed, vegetatively, and to a much lesser extent florally, *Hevea Benthamiana* often strikingly resembles *H. Spruceana*, a similarity which doubtlessly underlay Spruces as well as Benthams confusion of the two concepts as one. The panicles are tomentose in both collections, albeit a distinct color difference may be noted; and the floral stalk in both is rather short. Benthams continues by stating "calycibus obtusis," probably meaning by the term "calycibus" buds or the closed calyx, in which case it is obvious that he is describing *Spruce* 1171 and not 2560, for in 2560, the buds, as described by Mueller, are "longius acuminatis" and the calyx lobes "longe acuminatis." *Hevea discolor* was described as having from seven to ten anthers disposed in two whorls, a character which might refer either to *H. Spruceana* or to *H. Benthamiana*.

Following the technical Latin description, Benthams English discussion provides additional characters of importance. The mode of branching which is described can be seen in individuals of both *Hevea Spruceana* and *H. Benthamiana*, but my experience leads me to associate it more frequently with the former than with the latter. The latex is said to yield an elastic rubber. This is an

interesting comment, since it is impossible to obtain an elastic rubber from true *Hevea Spruceana*; yet the quality of the product of *H. Benthamiana* is usually only slightly inferior to (and frequently as high as) that of *H. brasiliensis*, the source of the best rubber. In ascribing to the flowers of *Hevea discolor* a "reddish purple" hue, Bentham is very definitely describing a character of *H. Spruceana*; *H. Benthamiana* is known to have bright lemon-yellow flowers. Judging from the amount and kind of variation which Bentham describes for the anthers of *Hevea discolor*, we might be moved to think more of *H. Benthamiana* than of *H. Spruceana*. Although some variation is found in the number and placement of the anthers in the latter species, there is very much less instability than is evident in the former.

Bentham considered *Siphonia Spruceana* and *S. pauciflora* directly following the description and discussion of *S. discolor*. Describing *Siphonia Spruceana* as a plant of the banks of the Amazon below Santarem, Bentham stated (l. c. 370) that it has "numerous flowers, purple withinside, and much larger than in *S. discolor*," but he made no definite statement that he considered it to be allied at all closely to *S. discolor*. On the contrary, and rather surprisingly, he wrote (l. c. 370) of *Siphonia pauciflora*, a species which Spruce collected in rocky situations along the Rio Uaupés: "This is certainly near to *S. discolor*, and may prove a mere variety."

Although it is clear that Bentham based his description of *Hevea discolor* on the two collections, it is plain that the greater weight in both the English and the Latin description is given to *Spruce 1171* which represents *H. Spruceana*. I, therefore, typify *Hevea discolor* by choosing *Spruce 1171* as the lectotype of this concept.

We may then treat the binomial *Hevea discolor*, as Ducke definitely has done (in Arch. Jard. Bot. Rio

Janeiro 5 (1930) 156 and in Bol. Técn. Instit. Agron. Norte no. 10 (1946) 20, 23), as a synonym of *H. Spruceana*. The fact that *Hevea discolor* has page priority over *H. Spruceana* is of no significance, since Ducke, in 1930, first combined them under the latter binomial. Thus, this name, which has caused so much confusion and uncertainty, henceforth need not be a source of worry to students of the genus of the Pará rubber tree.